# Citation 5.0

CITATION 5.0 BUS PROTOCOL
INSTRUCTIONS & OPERATION MANUAL
MASTER DOCUMENT
SOFTWARE VERSION X.X

# TABLE OF CONTENTS

Software Revision History _____ 3

Description _____ 4

Interface Module Hook-up_____ 5, 6

Code Structure _____ 7 - 9

Single Byte Command Sample _____ 9

Computing a Checksum_____ 9

Computer Commands:
- Power Commands_____ 10
- Remote Commands_____ 11
- Program Select _____ 12
- Mode Select_____ 12
- Master Volume _____ 13
- R-L system Balance_____ 14
- F-B system Balance_____ 15
- Individual Channel Trim_____ 16
- Table 1 (Trim setting table)_____ 17
- Mute _____ 18
- Display _____ 18
- Panorama_____ 18
- High Frequency EQ_____ 18
- Bass EQ_____ 19
- Center Channel_____ 19
- Trigger 1_____ 19
- Trigger 2_____ 19
- User Lock Out_____ 20
- Stereo _____ 20
- Remote Zone Select_____ 20
- Remote Zone Level _____ 21

System Status Request Command_____ 22
- Multi data Response_____ 22
- Single data Response_____ 22
- Multi data request command_____23 - 27

# SOFTWARE REVISION FEATURES

The following is a list of the software revisions to the first version of software to the current. Verify the version of software in your unit by viewing the VFD (Vacuum Fluorescent Display) on the front panel or the on-screen graphics immediately after you turn on the Citation 5.0 processor.

**Version X.X:** First release.

## How does it work?

The Citation Communication Protocol is designed specifically for controlling audio and video equipment. It was developed in response to a need for a low-cost, simple, fault-tolerant communications protocol. It is based on the EIA RS-485 electrical specification and utilizes CSCD (collision sense, carrier detect) to allow multiple devices to send and receive data on the same pair of wires. Data is communicated at **9600 baud, 8 data bits, 1 stop bit** and **no parity**. The command set is similar to CONDI™ developed by Audioaccess. Citation and Audioaccess products can share the same data bus. Additionally, multiple 5.0s may be connected on the same data bus and communicated with by simply changing the Unit ID in the 5.0 and addressing that ID when sending a command on the data bus.

Before beginning data transmission, check the bus for inactivity. If the bus is free, transmission may commence. If the bus is being used, wait for a period of inactivity. Check each byte of a transmission against the intended message to ensure that data corruption does not occur due to multiple devices attempting to use the bus at the same time. For each data transmission not originating from the main controller, the main controller will automatically generate an acknowledgment (38*h*) (i.e. any information coming into the main controller gets an ACK). The device which sent the data should receive this acknowledgment before beginning its next data transmission. Under rare circumstances, the main controller may be performing a function which cannot be interrupted. The data should be retransmitted until an acknowledgment is received. Due to this fact, delays are required between incoming commands for the transmission of the required acknowledgment.

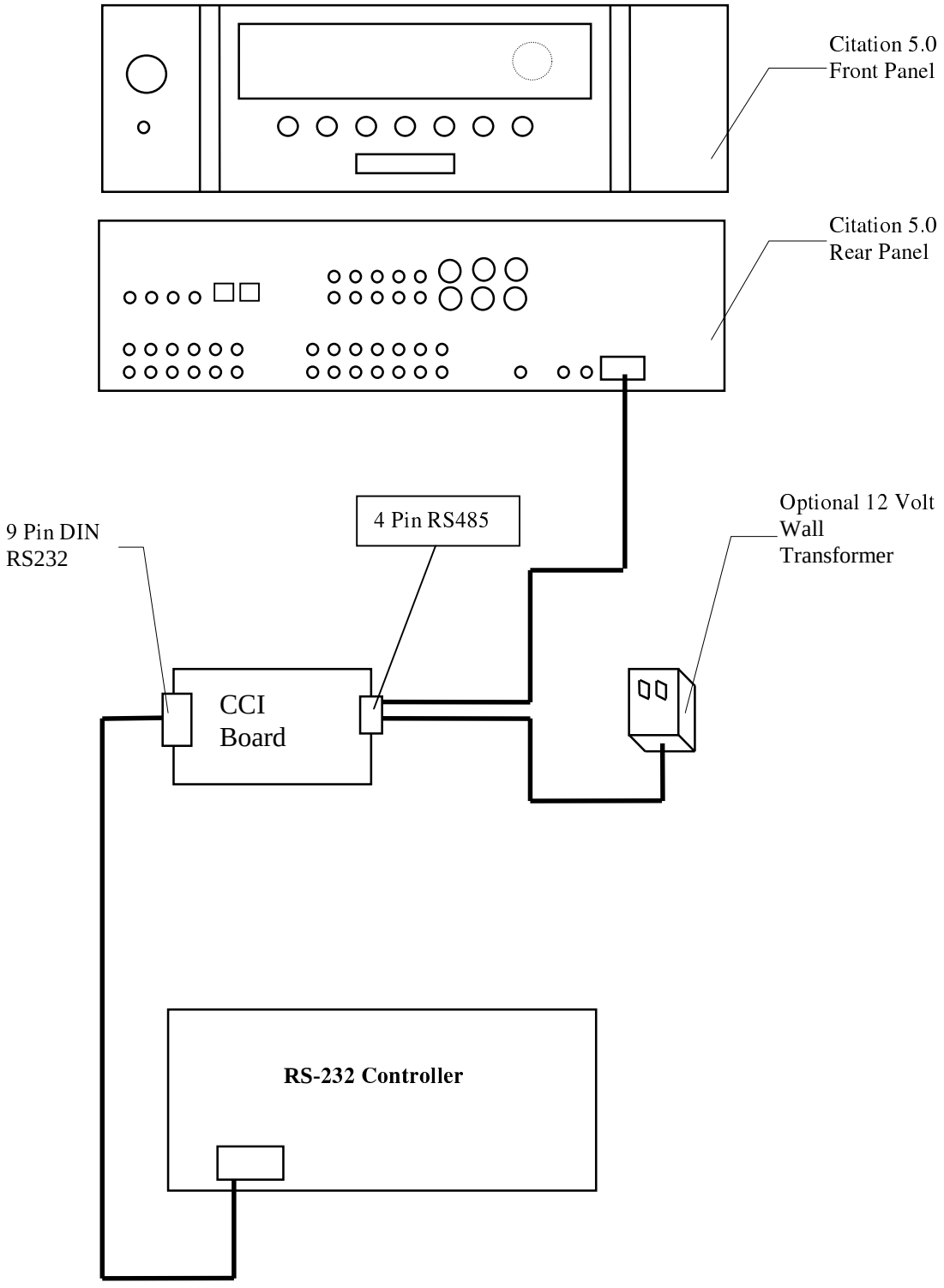
## Event driven output.

The Citation 5.0 will generate commands when the processor is accessed from an IR or Front panel button command. This command can be used to update external displays in real time or to generate a polling request for status.
The Command generated will be the identical to the Citation bus command for the same function. Example: the IR Volume + button on the remote will generate a Volume + button command on the Citation bus.

# INTERFACE MODULE HOOK-UP

Hooking up the Citation 5.0 to a Citation Communications Interface (CCI)

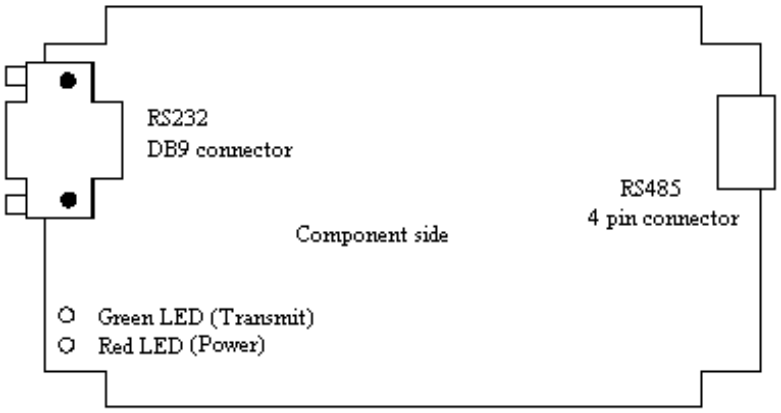
**Note: Please see page 6 for pin outs; this is especially important because the pin outs will not work with straight-through wiring from the Citation to the CCI board.**

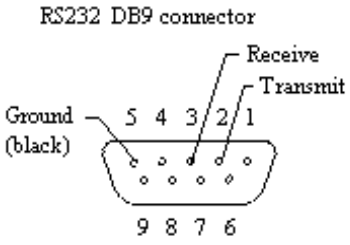


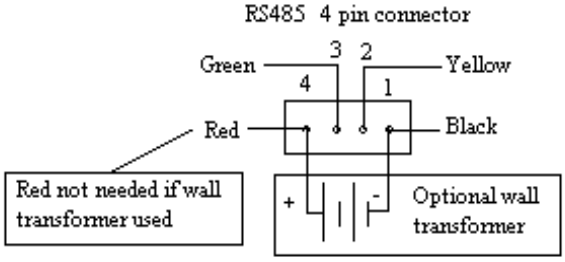
# INTERFACE MODULE HOOK-UP (CONT.)

Hooking up the Citation 5.0 to a Citation Communications Interface (CCI)

## CCI module

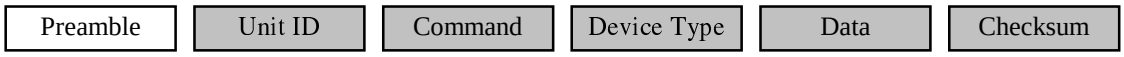


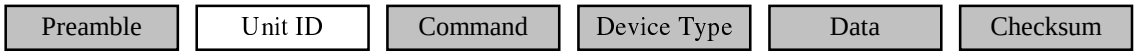



*Note:* the symbols "*b*", "*d*", and "*h*" used in this document denote binary, decimal, and hexadecimal values, respectively. All transmissions must be in hexadecimal.

# CODE STRUCTURE




The Preamble (Byte 1) is used to alert the system that a message is about to be transmitted. This allows the system to ignore random noise, and reliably receive valid messages. The Preamble is always equal to 7E*h*.




The unit ID identifies the unit. Set internally in the 5.0, default = 00*h*
If you are using more than one 5.0 you will need to modify this byte to reflect the ID number of the unit you want to control.

The Command is the type of operation you want to perform.

POWER = 01*h*
REMOTE BUTTON = 02*h*
PROGRAM SELECT = 03*h*
MODE SELECT = 04*h*
MASTER VOLUME = 05*h*
R-L SYSTEM BALANCE = 06*h*
F-B SYSTEM BALANCE = 07*h*
MUTE = 08*h*
DISPLAY = 09*h*
PANORAMA = 0B*h*
HIGH FREQUENCY EQ = 0D*h*
BASS EQ = 0E*h*
CENTER CHANNEL = 0F*h*
TRIGGER 1 = 13*h*
TRIGGER 2 = 14*h*
USER LOCK OUT = 15*h*
STEREO = 16*h*
REMOTE ZONE SELECT = 19*h*
REMOTE ZONE LEVEL = 1B*h*
REQUEST STATUS = 21*h*
MULTI BYTE RESPONSE = 39*h*

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|

The Device Type is used to determine which piece of equipment in the system that a message applies to. (In the case of Citation products there is only one device type available).

Citation 5.0 = 50*h*

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|

Provides additional information required by the Command. See the data charts starting on page 11.

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|

The Checksum is a byte whose value confirms/voids the validity of a received message. It is computed by adding up the Preamble, Unit ID, Command, Device Type, Data, and then taking the 1s complement of the lower eight bits of that sum (i.e. add up all the bytes, truncate to eight bits, and invert each of the bits). If the result equals 7E*h*, add 01*h*. *See the following page for more details.*

# SINGLE BYTE COMMAND SAMPLE

Create a Power On command for a Citation 5.0 in a single system using default settings.

Preamble = 7E*h*

Unit ID = 00*h*

Command = 01*h*

Device Type = 50*h*

Data = 00*h*

0111 1110*b* (7E*h*)
0000 0000*b* (00*h*)
0000 0001*b* (01*h*)
0101 0000*b* (50*h*)
+ 0000 0000*b* (00*h*)

0 1100 1111*b* (sum = 0CF*h*)

1100 1111*b* (truncating = CF*h*)

0011 0000*b* (inverting bits = 30*h*)

0011 0000*b* (30*h* ≠ 7E*h*, so don't add 01*h*)

Checksum = 30*h*

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 01*h* | 50h | 00*h* | 30*h* |

# COMPUTER COMMANDS

## POWER COMMAND

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 01*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | POWER ON |
| 01 | STANDBY |

*Note:* Computer commands should be used anytime another controller wishes to interact with the Citation system, such as in a whole-house automation application

## REMOTE COMMANDS

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 02*h* | 50h | See below | See page 4 |

PAN BUTTON = 00*h*
MUTE BUTTON = 01*h*
STEREO BUTTON = 02*h*
UP BUTTON = 03*h*
VOLUME UP BUTTON = 04*h*
PROGRAM6 BUTTON = 05*h*
CUST3 BUTTON = 06*h*
PROGRAM1 BUTTON = 07*h*
MONO BUTTON = 08*h*
PROGRAM5 BUTTON = 09*h*
PROGRAM3 BUTTON = 0A*h*
CUST2 BUTTON = 0B*h*
PROGRAM2 BUTTON = 0C*h*
DOLBY BUTTON = OD*h*
PROGRAM4 BUTTON = 0E*h*
LEFT BUTTON = 0F*h*
STANDBY BUTTON = 10*h*
RIGHT BUTTON = 11*h*
VOLUME DOWN BUTTON = 12*h*
6AXIS BUTTON = 13*h*
HIGH EQ BUTTON = 14*h*
CENTER BUTTON = 15*h*
WIDE BUTTON = 16*h*
BOOST BUTTON = 17*h*
WATCH BUTTON = 18*h*
LISTEN BUTTON = 19*h*
PARTY BUTTON = 1A*h*
RESET BUTTON = 1B*h*
BASS EQ + BUTTON = 1C*h*
BASS EQ - BUTTON = 1D*h*
PROGRAM7 BUTTON = 1E*h*
PROGRAM12 BUTTON = 1F*h*
BAL BUTTON = 20*h*
CUST1 BUTTON = 21*h*
DISPLAY BUTTON = 22*h*
DOWN BUTTON = 23*h*
PROGRAM11 BUTTON = 24*h*
PROGRAM10 BUTTON = 25*h*
PROGRAM8 BUTTON = 26*h*
PROGRAM9 BUTTON = 27*h*
CANCEL BUTTON = 28*h*
MENU BUTTON = 29*h*
RMT ZN 1 BUTTON = 2A*h*
RMT ZN 2 BUTTON = 2B*h*
RMT ZN 3 BUTTON = 2C*h*
RMT ZN 4 BUTTON = 2D*h*
RMT ZN 5 BUTTON = 2E*h*
RMT ZN 6 BUTTON = 2F*h*
RMT ZN VOL + BUTTON = 30*h*
RMT ZN VOL – BUTTON = 31*h*
RMT ZN MUTE BUTTON = 32*h*
RMT ZN OFF BUTTON = 33*h*
TRIGGER 1 + BUTTON = 34*h*
TRIGGER 1 – BUTTON = 35*h*
TRIGGER 2 + BUTTON = 36*h*
TRIGGER 2 – BUTTON = 37*h*

# Program Select

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 03*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION | HEX | COMMAND DESCRIPTION |
|---|---|---|---|
| 00 | PROGRAM 1 | 06 | PROGRAM 7 |
| 01 | PROGRAM 2 | 07 | PROGRAM 8 |
| 02 | PROGRAM 3 | 08 | PROGRAM 9 |
| 03 | PROGRAM 4 | 09 | PROGRAM 10 |
| 04 | PROGRAM 5 | 0A | PROGRAM 11 |
| 05 | PROGRAM 6 | 0B | PROGRAM 12 |

## MODE SELECT

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 04*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | DOLBY PROLOGIC |
| 01 | DOLBY DIGITAL |
| 02 | 6 AXIS |
| 03 | CUSTOM 1 |
| 04 | CUSTOM 2 |
| 05 | CUSTOM 3 |
| 06 | PARTY |

*Note:* The Citation system will respond with On Screen and Front Panel displays.

# COMPUTER COMMANDS (CONT.)

## MASTER VOLUME

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 05*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | +00 MIN. VOLUME |
| 01 | +01 |
| 02 | +02 |
| 03 | +03 |
| 04 | +04 |
| 05 | +05 |
| 06 | +06 |
| 07 | +07 |
| 08 | +08 |
| 09 | +09 |
| 0A | +10 |
| 0B | +11 |
| 0C | +12 |
| 0D | +13 |
| 0E | +14 |
| 0F | +15 |
| 10 | +16 |
| 11 | +17 |
| 12 | +18 |
| 13 | +19 |
| 14 | +20 |
| 15 | +21 |
| 16 | +22 |
| 17 | +23 |
| 18 | +24 |
| 19 | +25 |
| 1A | +26 |
| 1B | +27 |
| 1C | +28 |
| 1D | +29 |
| 1E | +30 |
| 1F | +31 |
| 20 | +32 |
| 21 | +33 |
| 22 | +34 |
| 23 | +35 |
| 24 | +36 |
| 25 | +37 |
| 26 | +38 |
| 27 | +39 |
| 28 | +40 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 29 | +41 |
| 2A | +42 |
| 2B | +43 |
| 2C | +44 |
| 2D | +45 |
| 2E | +46 |
| 2F | +47 |
| 30 | +48 |
| 31 | +49 |
| 32 | +50 |
| 33 | +51 |
| 34 | +52 |
| 35 | +53 |
| 36 | +54 |
| 37 | +55 |
| 38 | +56 |
| 39 | +57 |
| 3A | +58 |
| 3B | +59 |
| 3C | +60 |
| 3D | +61 |
| 3E | +62 |
| 3F | +63 |
| 40 | +64 |
| 41 | +65 |
| 42 | +66 |
| 43 | +67 |
| 44 | +68 |
| 45 | +69 |
| 46 | +70 |
| 47 | +71 |
| 48 | +72 |
| 49 | +73 |
| 50 | +74 |
| 51 | +75 |
| 52 | +76 |
| 53 | +77 |
| 54 | +78 |
| 55 | +79 MAX.Volume. |

*Note:* The Citation system's audio changes immediately. No On Screen display when front panel is dimmed. When front panel is on, the volume digit changes in 4-5 seconds.

**. . . . . WARNING . . . . . .**
**If you are using this feature to ramp up and down the volume, you MUST make sure to set your limits so you do not roll over to either MAX. or MIN. volume levels. Speaker damage will occur if you do roll over to Max. volume.**

# R-L SYSTEM BALANCE

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 06*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION | HEX | COMMAND DESCRIPTION | | HEX | COMMAND DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| 4F | +79 R MAX. RIGHT | 15 | +21 R | | DB | +37 L | |
| 4E | +78 R | 14 | +20 R | | DA | +38 L | |
| 4D | +77 R | 13 | +19 R | | D9 | +39 L | |
| 4C | +76 R | 12 | +18 R | | D8 | +40 L | |
| 4B | +75 R | 11 | +17 R | | D7 | +41 L | |
| 4A | +74 R | 10 | +16 R | | D6 | +42 L | |
| 49 | +73 R | 0F | +15 R | | D5 | +43 L | |
| 48 | +72 R | 0E | +14 R | | D4 | +44 L | |
| 47 | +71 R | 0D | +13 R | | D3 | +45 L | |
| 46 | +70 R | 0C | +12 R | | D2 | +46 L | |
| 45 | +69 R | 0B | +11 R | | D1 | +47 L | |
| 44 | +68 R | 0A | +10 R | | D0 | +48 L | |
| 43 | +67 R | 09 | +09 R | | CF | +49 L | |
| 42 | +66 R | 08 | +08 R | | CE | +50 L | |
| 41 | +65 R | 07 | +07 R | | CD | +51 L | |
| 40 | +64 R | 06 | +06 R | | CC | +52 L | |
| 3F | +63 R | 05 | +05 R | | CB | +53 L | |
| 3E | +62 R | 04 | +04 R | | CA | +54 L | |
| 3D | +61 R | 03 | +03 R | | C9 | +55 L | |
| 3C | +60 R | 02 | +02 R | | C8 | +56 L | |
| 3B | +59 R | 01 | +01 R | MORE RIGHT | C7 | +57 L | |
| 3A | +58 R | 00 | +00 | CENTERED | C6 | +58 L | |
| 39 | +57 R | FF | +01 L | MORE LEFT | C5 | +59 L | |
| 38 | +56 R | FE | +02 L | | C4 | +60 L | |
| 37 | +55 R | FD | +03 L | | C3 | +61 L | |
| 36 | +54 R | FC | +04 L | | C2 | +62 L | |
| 35 | +53 R | FB | +05 L | | C1 | +63 L | |
| 34 | +52 R | FA | +06 L | | C0 | +64 L | |
| 33 | +51 R | F9 | +07 L | | BF | +65 L | |
| 32 | +50 R | F8 | +08 L | | BE | +66 L | |
| 31 | +49 R | F7 | +09 L | | BD | +67 L | |
| 30 | +48 R | F6 | +10 L | | BC | +68 L | |
| 2F | +47 R | F5 | +11 L | | BB | +69 L | |
| 2E | +46 R | F4 | +12 L | | BA | +70 L | |
| 2D | +45 R | F3 | +13 L | | B9 | +71 L | |
| 2C | +44 R | F2 | +14 L | | B8 | +72 L | |
| 2B | +43 R | F1 | +15 L | | B7 | +73 L | |
| 2A | +42 R | F0 | +16 L | | B6 | +74 L | |
| 29 | +41 R | EF | +17 L | | B5 | +75 L | |
| 28 | +40 R | EE | +18 L | | B4 | +76 L | |
| 27 | +39 R | ED | +19 L | | B3 | +77 L | |
| 26 | +38 R | EC | +20 L | | B2 | +78 L | |
| 25 | +37 R | EB | +21 L | | B1 | +79 L | MAX. LEFT |
| 24 | +36 R | EA | +22 L | | | | |
| 23 | +35 R | E9 | +23 L | | | | |
| 22 | +34 R | E8 | +24 L | | | | |
| 21 | +33 R | E7 | +25 L | | | | |
| 20 | +32 R | E6 | +26 L | | | | |
| 1F | +31 R | E5 | +27 L | | | | |
| 1E | +30 R | E4 | +28 L | | | | |
| 1D | +29 R | E3 | +29 L | | | | |
| 1C | +28 R | E2 | +30 L | | | | |
| 1B | +27 R | E1 | +31 L | | | | |
| 1A | +26 R | E0 | +32 L | | | | |
| 19 | +25 R | DF | +33 L | | | | |
| 18 | +24 R | DE | +34 L | | | | |
| 17 | +23 R | DD | +35 L | | | | |
| 16 | +22 R | DC | +36 L | | | | |

*Note:* As a general rule, be aware for every increment you take in one direction, it decrements from the other, however it only decrements down to 0 volume and you can increment up to Max. volume. We recommend that you do not move more than 8 counts in one direction.

# COMPUTER COMMANDS (CONT.)

## F-B SYSTEM BALANCE

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 07*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 4F | +79 FT MAX. FRONT |
| 4E | +78 FT |
| 4D | +77 FT |
| 4C | +76 FT |
| 4B | +75 FT |
| 4A | +74 FT |
| 49 | +73 FT |
| 48 | +72 FT |
| 47 | +71 FT |
| 46 | +70 FT |
| 45 | +69 FT |
| 44 | +68 FT |
| 43 | +67 FT |
| 42 | +66 FT |
| 41 | +65 FT |
| 40 | +64 FT |
| 3F | +63 FT |
| 3E | +62 FT |
| 3D | +61 FT |
| 3C | +60 FT |
| 3B | +59 FT |
| 3A | +58 FT |
| 39 | +57 FT |
| 38 | +56 FT |
| 37 | +55 FT |
| 36 | +54 FT |
| 35 | +53 FT |
| 34 | +52 FT |
| 33 | +51 FT |
| 32 | +50 FT |
| 31 | +49 FT |
| 30 | +48 FT |
| 2F | +47 FT |
| 2E | +46 FT |
| 2D | +45 FT |
| 2C | +44 FT |
| 2B | +43 FT |
| 2A | +42 FT |
| 29 | +41 FT |
| 28 | +40 FT |
| 27 | +39 FT |
| 26 | +38 FT |
| 25 | +37 FT |
| 24 | +36 FT |
| 23 | +35 FT |
| 22 | +34 FT |
| 21 | +33 FT |
| 20 | +32 FT |
| 1F | +31 FT |
| 1E | +30 FT |
| 1D | +29 FT |
| 1C | +28 FT |
| 1B | +27 FT |
| 1A | +26 FT |
| 19 | +25 FT |
| 18 | +24 FT |
| 17 | +23 FT |
| 16 | +22 FT |

| HEX | COMMAND DESCRIPTION | |
|---|---|---|
| 15 | +21 FT | |
| 14 | +20 FT | |
| 13 | +19 FT | |
| 12 | +18 FT | |
| 11 | +17 FT | |
| 10 | +16 FT | |
| 0F | +15 FT | |
| 0E | +14 FT | |
| 0D | +13 FT | |
| 0C | +12 FT | |
| 0B | +11 FT | |
| 0A | +10 FT | |
| 09 | +09 FT | |
| 08 | +08 FT | |
| 07 | +07 FT | |
| 06 | +06 FT | |
| 05 | +05 FT | |
| 04 | +04 FT | |
| 03 | +03 FT | |
| 02 | +02 FT | |
| 01 | +01 FT | MORE FRONT |
| 00 | +00 | CENTERED |
| FF | +01 BK | MORE BACK |
| FE | +02 BK | |
| FD | +03 BK | |
| FC | +04 BK | |
| FB | +05 BK | |
| FA | +06 BK | |
| F9 | +07 BK | |
| F8 | +08 BK | |
| F7 | +09 BK | |
| F6 | +10 BK | |
| F5 | +11 BK | |
| F4 | +12 BK | |
| F3 | +13 BK | |
| F2 | +14 BK | |
| F1 | +15 BK | |
| F0 | +16 BK | |
| EF | +17 BK | |
| EE | +18 BK | |
| ED | +19 BK | |
| EC | +20 BK | |
| EB | +21 BK | |
| EA | +22 BK | |
| E9 | +23 BK | |
| E8 | +24 BK | |
| E7 | +25 BK | |
| E6 | +26 BK | |
| E5 | +27 BK | |
| E4 | +28 BK | |
| E3 | +29 BK | |
| E2 | +30 BK | |
| E1 | +31 BK | |
| E0 | +32 BK | |
| DF | +33 BK | |
| DE | +34 BK | |
| DD | +35 BK | |
| DC | +36 BK | |

| HEX | COMMAND DESCRIPTION | |
|---|---|---|
| DB | +37 BK | |
| DA | +38 BK | |
| D9 | +39 BK | |
| D8 | +40 BK | |
| D7 | +41 BK | |
| D6 | +42 BK | |
| D5 | +43 BK | |
| D4 | +44 BK | |
| D3 | +45 BK | |
| D2 | +46 BK | |
| D1 | +47 BK | |
| D0 | +48 BK | |
| CF | +49 BK | |
| CE | +50 BK | |
| CD | +51 BK | |
| CC | +52 BK | |
| CB | +53 BK | |
| CA | +54 BK | |
| C9 | +55 BK | |
| C8 | +56 BK | |
| C7 | +57 BK | |
| C6 | +58 BK | |
| C5 | +59 BK | |
| C4 | +60 BK | |
| C3 | +61 BK | |
| C2 | +62 BK | |
| C1 | +63 BK | |
| C0 | +64 BK | |
| BF | +65 BK | |
| BE | +66 BK | |
| BD | +67 BK | |
| BC | +68 BK | |
| BB | +69 BK | |
| BA | +70 BK | |
| B9 | +71 BK | |
| B8 | +72 BK | |
| B7 | +73 BK | |
| B6 | +74 BK | |
| B5 | +75 BK | |
| B4 | +76 BK | |
| B3 | +77 BK | |
| B2 | +78 BK | |
| B1 | +79 BK | MAX. BACK |

*Note:* As a general rule, be aware for every increment you take in one direction, it decrements from the other, however it only decrements down to 0 volume and you can increment up to Max. volume. We recommend that you do not move more than 8 counts in one direction.

# COMPUTER COMMANDS (CONT.)

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 08*h* | 50h | See below | See page 4 |

*Note:* The Citation system's audio changes immediately, Front Panel and On Screen display.

## PANEL DIM

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 09*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | PANEL OFF |
| 01 | PANEL ON |

*Note:* Front Panel changes immediately.

## PANORAMA

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0A*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | PANORAMA OFF |
| 01 | MONO |
| 02 | PANORAMA MIN. |
| 03 | PANORAMA MED. |
| 04 | PANORAMA MAX. |

*Note:* On Screen and Front Panel display.

## HIGH FREQUENCY EQ

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0B*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | HI EQ OFF (FLAT) |
| 01 | HI EQ ON (CUT) |

*Note:* On Screen and Front Panel display.

# COMPUTER COMMANDS (CONT.)

## BASS EQ

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0C*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | 0 dB |
| 01 | 2 dB |
| 02 | 4 dB |
| 03 | 6 dB |
| 04 | 8 dB |

*Note:* On Screen and Front Panel display.

## CENTER CHANNEL

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0D*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | CENTER OFF |
| 01 | CENTER ON (NORMAL) |
| 02 | CENTER BOOST |
| 03 | CENTER WIDE |
| 04 | CENTER WIDE + BOOST |

*Note:* On Screen and Front Panel acknowledgment.

## MANUAL TRIGGER 1

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0E*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | TRIGGER 1 OFF |
| 01 | TRIGGER 1 ON |

## MANUAL TRIGGER 2

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 0Fh | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | TRIGGER 2 OFF |
| 01 | TRIGGER 2 ON |

# (COMPUTER COMMANDS CONT.)

## USER LOCK OUT

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 10*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | LOCK OUT OFF |
| 01 | LOCK OUT IR AND FRONT PANEL |

*Note:* No visual indication other that you may or may not be able to control the 5.0 processor. To turn the lock out off from the front panel, press in this order: Volume Ø , Mute, Watch Œ and Listen Œ .

## STEREO/MONO/FX

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 11*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | STEREO ON |
| 01 | STEREO OFF |
| 02 | MONO |

*Note:* On Screen and Front Panel display.

## REMOTE ZONE SELECT

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 12*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | SOURCE 1 |
| 01 | SOURCE 2 |
| 02 | SOURCE 3 |
| 03 | SOURCE 4 |
| 04 | SOURCE 5 |
| 05 | SOURCE 6 |
| 06 | REMOTE ZONE OFF |

*Note:* No On Screen or Front Panel display. The source changes immediately. If you do go into on-screen programming it will have the correct settings.

# REMOTE ZONE LEVEL

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 13*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | -00 MAX. VOLUME |
| 01 | -01 |
| 02 | -02 |
| 03 | -03 |
| 04 | -04 |
| 05 | -05 |
| 06 | -06 |
| 07 | -07 |
| 08 | -08 |
| 09 | -09 |
| 0A | -10 |
| 0B | -11 |
| 0C | -12 |
| 0D | -13 |
| 0E | -14 |
| 0F | -15 |
| 10 | -16 |
| 11 | -17 |
| 12 | -18 |
| 13 | -19 |
| 14 | -20 |
| 15 | -21 |
| 16 | -22 |
| 17 | -23 |
| 18 | -24 |
| 19 | -25 |
| 1A | -26 |
| 1B | -27 |
| 1C | -28 |
| 1D | -29 |
| 1E | -30 |
| 1F | -31 |
| 20 | -32 |
| 21 | -33 |
| 22 | -34 |
| 23 | -35 |
| 24 | -36 |
| 25 | -37 |
| 26 | -38 |
| 27 | -39 |
| 28 | -40 |
| 29 | -41 |
| 2A | -42 |
| 2B | -43 |
| 2C | -44 |
| 2D | -45 |
| 2E | -46 |
| 2F | -47 |
| 30 | -48 |
| 31 | -49 |
| 32 | -50 |
| 33 | -51 |
| 34 | -52 |
| 35 | -53 |
| 36 | -54 |
| 37 | -55 |
| 38 | -56 |
| 39 | -57 |
| 3A | -58 |
| 3B | -59 |
| 3C | -60 |
| 3D | -61 |
| 3E | -62 |
| 3F | -63 MIN. VOLUME |

*Note:* The Citation system's audio changes immediately. No On Screen display when front panel is dimmed. When front panel is on, the volume digit changes in 4-5 seconds.

**. . . . . WARNING . . . . . If you are using this feature to ramp up and down the volume, you MUST make sure to set your limits so you do not roll over to either MAX. or MIN. volume levels. Speaker damage will occur if you do roll over to Max. volume.**

# COMPUTER COMMANDS (CONT.)

## REMOTE ZONE MUTE

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 14*h* | 50h | See below | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 00 | MUTE ON |
| 01 | MUTE OFF |

# COMPUTER COMMANDS (CONT.)
# INDIVIDUAL CHANNEL TRIM

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | See below | 50h | See Table 1 | See page 4 |

| HEX | COMMAND DESCRIPTION |
|---|---|
| 15*h* | CENTER LEVEL SELECT |
| 16*h* | FRONT RIGHT LEVEL SELECT |
| 17*h* | FRONT LEFT LEVEL SELECT |
| 18*h* | SIDE RIGHT LEVEL SELECT |
| 19*h* | SIDE LEFT LEVEL SELECT |
| 1A *h* | BACK RIGHT LEVEL SELECT |
| 1B *h* | BACK LEFT LEVEL SELECT |
| 1C *h* | SUB RIGHT LEVEL SELEECT |
| 1D *h* | SUB LEFT LEVEL SELECT |
| 1E *h* | SUB MIDDLE LEVEL SELECT |

# COMPUTER COMMANDS (CONT.)
# TABLE 1

| HEX | COMMAND DESCRIPTION | HEX | COMMAND DESCRIPTION | HEX | COMMAND DESCRIPTION |
|---|---|---|---|---|---|
| 4F | +79 MAX. TRIM VOLUME | 15 | +21 | DB | -37 |
| 4E | +78 | 14 | +20 | DA | -38 |
| 4D | +77 | 13 | +19 | D9 | -39 |
| 4C | +76 | 12 | +18 | D8 | -40 |
| 4B | +75 | 11 | +17 | D7 | -41 |
| 4A | +74 | 10 | +16 | D6 | -42 |
| 49 | +73 | 0F | +15 | D5 | -43 |
| 48 | +72 | 0E | +14 | D4 | -44 |
| 47 | +71 | 0D | +13 | D3 | -45 |
| 46 | +70 | 0C | +12 | D2 | -46 |
| 45 | +69 | 0B | +11 | D1 | -47 |
| 44 | +68 | 0A | +10 | D0 | -48 |
| 43 | +67 | 09 | +09 | CF | -49 |
| 42 | +66 | 08 | +08 | CE | -50 |
| 41 | +65 | 07 | +07 | CD | -51 |
| 40 | +64 | 06 | +06 | CC | -52 |
| 3F | +63 | 05 | +05 | CB | -53 |
| 3E | +62 | 04 | +04 | CA | -54 |
| 3D | +61 | 03 | +03 | C9 | -55 |
| 3C | +60 | 02 | +02 | C8 | -56 |
| 3B | +59 | 01 | +01 TRIM UP | C7 | -57 |
| 3A | +58 | 00 | +00 ZERO | C6 | -58 |
| 39 | +57 | FF | -01 TRIM DOWN | C5 | -59 |
| 38 | +56 | FE | -02 | C4 | -60 |
| 37 | +55 | FD | -03 | C3 | -61 |
| 36 | +54 | FC | -04 | C2 | -62 |
| 35 | +53 | FB | -05 | C1 | -63 |
| 34 | +52 | FA | -06 | C0 | -64 |
| 33 | +51 | F9 | -07 | BF | -65 |
| 32 | +50 | F8 | -08 | BE | -66 |
| 31 | +49 | F7 | -09 | BD | -67 |
| 30 | +48 | F6 | -10 | BC | -68 |
| 2F | +47 | F5 | -11 | BB | -69 |
| 2E | +46 | F4 | -12 | BA | -70 |
| 2D | +45 | F3 | -13 | B9 | -71 |
| 2C | +44 | F2 | -14 | B8 | -72 |
| 2B | +43 | F1 | -15 | B7 | -73 |
| 2A | +42 | F0 | -16 | B6 | -74 |
| 29 | +41 | EF | -17 | B5 | -75 |
| 28 | +40 | EE | -18 | B4 | -76 |
| 27 | +39 | ED | -19 | B3 | -77 |
| 26 | +38 | EC | -20 | B2 | -78 |
| 25 | +37 | EB | -21 | B1 | -79 MAX ATTENUATION |
| 24 | +36 | EA | -22 | | |
| 23 | +35 | E9 | -23 | | |
| 22 | +34 | E8 | -24 | | |
| 21 | +33 | E7 | -25 | | |
| 20 | +32 | E6 | -26 | | |
| 1F | +31 | E5 | -27 | | |
| 1E | +30 | E4 | -28 | | |
| 1D | +29 | E3 | -29 | | |
| 1C | +28 | E2 | -30 | | |
| 1B | +27 | E1 | -31 | | |
| 1A | +26 | E0 | -32 | | |
| 19 | +25 | DF | -33 | | |
| 18 | +24 | DE | -34 | | |
| 17 | +23 | DD | -35 | | |
| 16 | +22 | DC | -36 | | |

*Note:* The starting point is where the volume for that speaker is set. You can not raise or lower the volume past the limits, (00 ±79). Example: If the volume is at “35”, the maximum you can raise it would be +44. Thus all the values above +44 would not raise the volume any higher.

# SYSTEM STATUS REQUEST COMMANDS

## REQUEST COMMAND

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | FE*h* | 50h | See below | See page 4 |

1) For a multi data response enter a Hex number between 23*h* and 27*h* see the status requests starting on page 22.
2) For a single data response for one item requested enter a Hex number between 01*h* and 1B*h* see list of commands on page 2.

## "MULTI DATA" RESPONSE

For a Group Data Request from 00*h* through 06*h*.

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | FF*h* | 50h | See below | See page 4 |

| Data # Requested | Byte 2 | ..... | Byte n |
|---|---|---|---|

## "SINGLE DATA" RESPONSE

For a Single Data Request from 01*h* through 1B*h*.

| Preamble | Unit ID | Command | Device Type | Data | Checksum |
|---|---|---|---|---|---|
| 7E*h* | 00*h* | 39*h* | 50h | See below | See page 4 |

| Data # Requested | Byte 2 |
|---|---|

# SYSTEM STATUS REQUEST COMMANDS (CONT.)
## REQUEST PARM BLOCK 1

| 00*h* | STANDBY | VOLUME | PROGRAM | INPUT LVL | MODE |
|---|---|---|---|---|---|

| COMMAND | HEX | COMMAND DESCRIPTION |
|---|---|---|
| STANDBY | 00 | = POWER ON |
| | 01 | = STANDBY |
| VOLUME | 00-55 | = 0-(+79) see table page 12 |
| PROGRAM | 00 | = PROGRAM 1 |
| | 01 | = PROGRAM 2 |
| | 02 | = PROGRAM 3 |
| | 03 | = PROGRAM 4 |
| | 04 | = PROGRAM 5 |
| | 05 | = PROGRAM 6 |
| | 06 | = PROGRAM 7 |
| | 07 | = PROGRAM 8 |
| | 08 | = PROGRAM 9 |
| | 09 | = PROGRAM 10 |
| | 0A | = PROGRAM 11 |
| | 0B | = PROGRAM 12 |
| INPUT LVL | E0-1F | = -32-(+31) |
| MODE | 00 | = DOLBY PROLOGIC |
| | 01 | = DOLBY DIGITAL |
| | 02 | = 6 AXIS |
| | 03 | = MONO |
| | 04 | = ACUSTOM 1 |
| | 05 | = ACUSTOM 2 |
| | 06 | = ACUSTOM 3 |
| | 07 | = DCUSTOM 1 |
| | 08 | = DCUSTOM 2 |
| | 09 | = DCUSTOM 3 |
| | 0A | = PARTY |
| | 0B | = STEREO |

# SYSTEM STATUS REQUEST COMMANDS (CONT.)
## REQUEST PARM BLOCK 2

| 01*h* | PAN | BASS EQ | HI EQ | CENTER | FILTERS |
|---|---|---|---|---|---|

| COMMAND | HEX | COMMAND DESCRIPTION |
|---|---|---|
| PAN | 00 | = PAN OFF |
| | 01 | = PAN MIN |
| | 02 | = PAN MED |
| | 03 | = PAN MAX |
| BASS EQ | 00 | = 0dB |
| | 01 | = 2dB |
| | 02 | = 4dB |
| | 03 | = 6dB |
| | 04 | = 8dB |
| HI EQ | 00 | = HI EQ OFF |
| | 01 | = HI EQ ON |
| CENTER | 00 | = CENTER OFF |
| | 01 | = CENTER ON (NORMAL) |
| | 02 | = CENTER BOOST |
| | 03 | = CENTER WIDE |
| | 04 | = CENTER WIDE + BOOST |
| FILTERS | 00 | = NONE |
| | 01 | = SHELF |
| | 02 | = 12K |
| | 03 | = 7K |
| | 04 | = DOLBY |

# SYSTEM STATUS REQUEST COMMANDS (CONT.)
## REQUEST PARM BLOCK 3

| 02*h* | AUD SRC | VID SRC | AUD RZ | VID RZ | RZ LVL |
|---|---|---|---|---|---|

**COMMAND HEX COMMAND DESCRIPTION**

AUDIO SOURCE
- 00 = SOURCE 1
- 01 = SOURCE 2
- 02 = SOURCE 3
- 03 = SOURCE 4
- 04 = SOURCE 5
- 05 = SOURCE 6
- 06 = SOURCE 7
- 07 = SOURCE 8
- 08 = SOURCE 9
- 09 = SOURCE 10
- 0A = SOURCE 11
- 0B = SOURCE 12

VIDEO SOURCE
- 00 = COMP 1
- 01 = COMP 2
- 02 = COMP 3
- 03 = COMP 4
- 04 = COMP 5
- 05 = COMP 6
- 06 = SVID 1
- 07 = SVID 2

REMOTE ZONE AUDIO
- 00 = SOURCE 1
- 01 = SOURCE 2
- 02 = SOURCE 3
- 03 = SOURCE 4
- 04 = SOURCE 5
- 05 = SOURCE 6
- 06 = REMOTE ZONE OFF

REMOTE ZONE VIDEO
- 00 = COMP 1
- 01 = COMP 2
- 02 = COMP 3
- 03 = COMP 4
- 04 = COMP 5
- 05 = COMP 6
- 06 = SVID 1
- 07 = SVID 2

REMOTE ZONE LEVEL
- 00-3F = 0-(-63)

# SYSTEM STATUS REQUEST COMMANDS (CONT.)

## REQUEST PARM BLOCK 4

| 03*h* | BALANCE F/B | BALANCE L/R | BALANCE INPUT |
|---|---|---|---|

| COMMAND | HEX | COMMAND DESCRIPTION |
|---|---|---|
| BALANCE F/B | 00 | = CENTERED |
| | 4F-B1 | = +79F-(+79B) |
| BALANCE L/R | 00 | = CENTERED |
| | 4F-B1 | = +79R-(+79L) |
| BALANCE INPUT | 00 | = CENTERED |
| | 3F-C1 | = +63R-(+63L) |

## REQUEST PARM BLOCK 5

| 04*h* | DISPLAY | USER LOCK | TRIGGER 1 | TRIGGER 2 |
|---|---|---|---|---|

| COMMAND | HEX | COMMAND DESCRIPTION |
|---|---|---|
| DISPLAY | 00 | = DISPLY DIMMED |
| | 01 | = DISPLAY ON |
| USER LOCK | 00 | = LOCK OUT OFF |
| | 01 | = LOCK OUT ON |
| TRIGGER 1 | 00 | = TRIGGER 1 OFF |
| | 01 | = TRIGGER 1 ON |
| TRIGGER 2 | 00 | = TRIGGER 2 OFF |
| | 01 | = TRIGGER 2 ON |

## REQUEST PARM BLOCK 6

| 05*h* | CENTER | FRNT RT | FRNT LEFT | SIDE RT | SIDE LEFT |
|---|---|---|---|---|---|
| BACK RT | BACK LEFT | SUB RT | SUB LEFT | SUB CENTER | |

You will get back a HEX value in the order as stated above. Check page 12 for the conversion of that HEX value to a volume level.

# SYSTEM STATUS REQUEST COMMANDS (CONT.)

# REQUEST PARM BLOCK 7

| 06*h* | REV # | PROGRAM 1 | --- | PROGRAM 12 | CUST. NAME |
|---|---|---|---|---|---|

This command asks for the ASCII character code for the software revision level, names attached to each program 1 – 12 and the customer name. This is a very long data stream 133 BYTES. The revision number (REV #) is 1 byte. The Cust. Name (customer name) is 12 ASCII characters long, and each program name (12 of them) is 10 ASCII characters long.